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the cylinder in any required position. There is a square groove made along the under-side of the cylinder 70; 73 is a pin which is driven into a hole made in the centre-head; the upper end of the pin 73 is made flat, and is fitted and also projects into the groove on the lower side of the cylinder; the pin is to prevent the cylinder from turning round; therefore, if the handle 69 of the screw be turned in one direction, the cylinder 70 will be forced out of the head, and if the handle of the screw be turned in the contrary direction, the cylinder will be withdrawn into the head, as shewn at fig. 1 *b;* 74 and 75 are screws and washers for fixing the centre and mandril-heads to the bed of the lathe.

No. XIII.

LEVER CRAMP.

The SILVER ISIS MEDAL was presented to Mr. ANDREW SMITH, 2, Palace Street, Pimlico, for his Lever Cramp; a Model of which has been placed in the Society's Repository.

THE object of the lever cramp is to furnish a powerful pressure, easy and convenient of application, for the purpose of bringing successively the boards employed in flooring rooms in close contact with each other previous to nailing them down. Several methods have heretofore been in use, which are either deficient in power, or cannot be applied without injuring the joists. Mr. Smith's instrument avoids both these objections; and the construction of it will be understood from the following description:—

Fig. 1, *a a a a a*, Plate VIII., part of the joists on which the floor-board *b* is nailed; against this the board *c* is to be pressed quite close, ready for nailing; for this purpose a clamp-board *d*, extending over five joists, is laid behind it; the cramp is then brought to the middle joist; its body *e* is a strong clamp, taking tight hold of the joist by means of a wedge; this forms the fulcrum from which the lever presses up the board.

Fig. 2, a back view; (this, with the parts, figs. 3, 4, 5, 6, and 7, are one-fifth the real size.) In fig. 2, though shewn in action, the wedge is removed, the better to shew its place; the side *f* has short teeth within, to stick in the joist and prevent slipping; the side *g*, where the wedge goes, has a movable plate *h* within it, held by two pins *i i*, sliding in holes in the side *g;* there is a small recess within this side, and also in the plate *h*, to receive the wedge which is driven between them, and guide it parallel to the joists, which is then firmly held between the plate *h* and side *f; k k*, two screws which hold the forked lever *l l* to the clamp *e;* the forks of the lever pass through poles *m m* in the sliding frame or cramp *n*, shewn separate in figs. 3 and 5, and as sliding out in the side view fig. 4; there are two recesses *o o* in the sides of the clamp *e* for this to slide in. The top and side views, figs. 8 and 9, one-tenth the size, shew the action; *j*, the wedge which fixes the clamp to the joist. The lever *l*, when thrown back as in fig. 9, draws in the frame *m;* in this position the clamp *e* is fixed to the joist; the lever is prevented from falling farther, so as to wrench off the clamp, by the prop *p*, which does not open farther than shewn, there being a stop above the joint at *q;* on raising the lever towards the position shewn by dotted lines, the cramp-plate or frame *n* is forced out, and urges before it the cramp-board *d;* this board is purposely made concave on the side which presses the floor-board *c*, and the lever has to bring it straight so as to touch all along over the five joists, by which the board *c* is equally pressed at those places and may be nailed down; and if the error of the board *d* is greater than what occurs in floor-boards, it will overcome them and press them quite close together. The prop *p* follows the lever, and retains it in the position to which it has been brought in strong action against the boards; the foot *r* of the prop *p* is spread out with teeth, to bear well on the joist.

Figs. 10, 11, and 12, shew a different form of cramp. *e e* fig. 10, the clamp which is fixed to the joist by a screw *s;* the movable plate *h* hangs on the screw so as to go and come with it; *t*, the aperture through which the bar *u u* of the cramp-plate *n* slides; figs. 13 and 14 shew an under and back view of the bar and plate *u n* separate; the lever *l* passes through the aperture *m* in the bar; *v*, a gap in which the lever is held by the screw *k*.

Fig. 11. A top view of the clamp, one-tenth the size, the others being a fifth, the lever *l* and plate *n* being removed. Fig. 12, a section; *w w*, the short teeth within the clamp; the aperture *t*, and bar *u*, are made thicker at the front towards *n;* in the first case the fulcrum *k* is below the joist, and the pressure level with the boards; in this case the fulcrum *k* is above the joists, level with the boards, and the pressure above, but in both cases the lever is so curved as to present its pressure towards the cramp-board *d* in all its positions. The upper portion of the lever, with its prop, is the same as fig. 9.

CERTIFICATES.

Sir, *Belgrave Place, Pimlico, May* 1, 1828.

I have seen Mr. Smith's portable lever cramp, and have proved it to be a very useful and powerful instrument; so much so, that I shall request it to be used in all my works. It may be used in many other ways besides flooring. I certainly am much pleased with it.

I am, Sir, &c. &c.

A. Aikin, Esq. H. Warren.
Secretary, &c. &c.

Sir,

I have seen Mr. Smith's portable lever cramp, and have no hesitation in saying, that it is a most powerful instrument, and will not only effectually answer the intended purpose of forcing flooring-boards together while in the act of laying them, but may also be employed for every purpose that a cramp can be used, in doors, shutters, &c., and even in cases where this latter instrument cannot be used.

I am, Sir, &c. &c.

A. Aikin, Esq. Peter Nicholson.
Secretary, &c. &c.

An experiment was made, at the desire of the Committee, by Mr. Smart, of which the following is an account:—Three flooring boards, two inches thick and eleven and a half inches wide, were at once brought up by the instrument as tight as could have been done by wedges applied between dogs in the usual way, and of course without wounding the joists. In order more completely to ascertain the comparative power of the two methods, bearers, ten feet apart, were placed on the side of a plank that had been nailed down; and on applying another plank, it was found to be kept an inch apart from the former by the interposition of the bearers. Mr. Smith's instrument was then made to act on the edge of the plank midway between the bearers, and forced that part in contact with the other plank. The dogs and wedges were then made trial of, but were not capable of exerting so strong a pressure as the lever cramp. Mr. Smart considers it to be a very powerful, useful, and commodious instrument.

No. XIV.

CARRIAGE FOR Mr. PALMER'S RAILWAY.

The SILVER ISIS MEDAL *and* FIVE POUNDS *were presented to Mr. T.* CHAPMAN, *4, Royal Row, Lambeth, for his Carriage for Mr.* PALMER'S *Patent Railway; a Model of which has been placed in the Society's Repository.*

SIR, 4, *Royal Row, Lambeth, Feb.* 11, 1828.

I BEG leave to offer to the Society for the Encouragement of Arts, a model of an improvement on Mr. Palmer's carriage and railway, by which the difficulty of turning an angle, and the loss of time necessary to accomplish